Space Weather Forecast

Issued on Thursday, 07 December 2023 at 13:18 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of further isolated Moderate-class flares (R1-R2 Blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is currently Moderate with a single Moderate-class flares in the past 24 hours, with a peak M2.3 at 06/2144 UTC which originated from a region in the northeast. There are currently nine sunspot regions on the visible disc. The most active is the aforementioned region in the northeast, which is showing some magnetic complexity. Two moderately large regions on the disc reside in the southwest. These form part of a complex of groups in this area, with magnetic connection between these regions, though spots appear to be spreading longitudinally with some reduction in areal extent. A region on the northwest is also of note, with a north-south magnetic alignment, perhaps increasing instability. The other regions on the disc appear mostly smaller and simpler at present.

A number of coronal mass ejections (CMEs) have been evident in coronagraph imagery during the past 24 hours. Although none are currently deemed to have any Earth-directed component, further imagery and analysis is required to confirm this.

Solar Wind / Geomagnetic Activity: Solar winds parameters show an ongoing but waning fast wind from a coronal hole. Wind speeds were elevated but have gradually fallen back to slightly elevated levels. The Interplanetary Magnetic Field has been weak. The important north-south component has varied weakly. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background levels with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate with a chance of further Moderate-class flares, mainly from the region in the northeast, but perhaps also from the regions in the western hemisphere.

Solar Winds / Geomagnetic Activity: No Earth directed CMEs currently feature in the forecast. Solar winds are currently at slightly elevated levels (around 490 km/s) due to waning effects from a coronal hole fast wind. Solar winds are expected to continue to decline through the coming days, becoming background on day 3 (09 Dec). On day 4 (10 Dec), the fast wind from a new coronal hole is expected to arrive, with speeds increasing to, or close to elevated levels.

Geomagnetic activity is expected to be largely Quiet through days 1-3 (07-09 Dec) with a chance of isolated Unsettled intervals. On day 4 (10 Dec), the arrival of a coronal hole fast wind should bring Unsettled to Active (Kp3-4) periods with a very slight chance of a G1/Minor Geomagnetic Storm interval (Kp5).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to remain at background levels, with no solar radiation storms expected.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	50	50	50	50
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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